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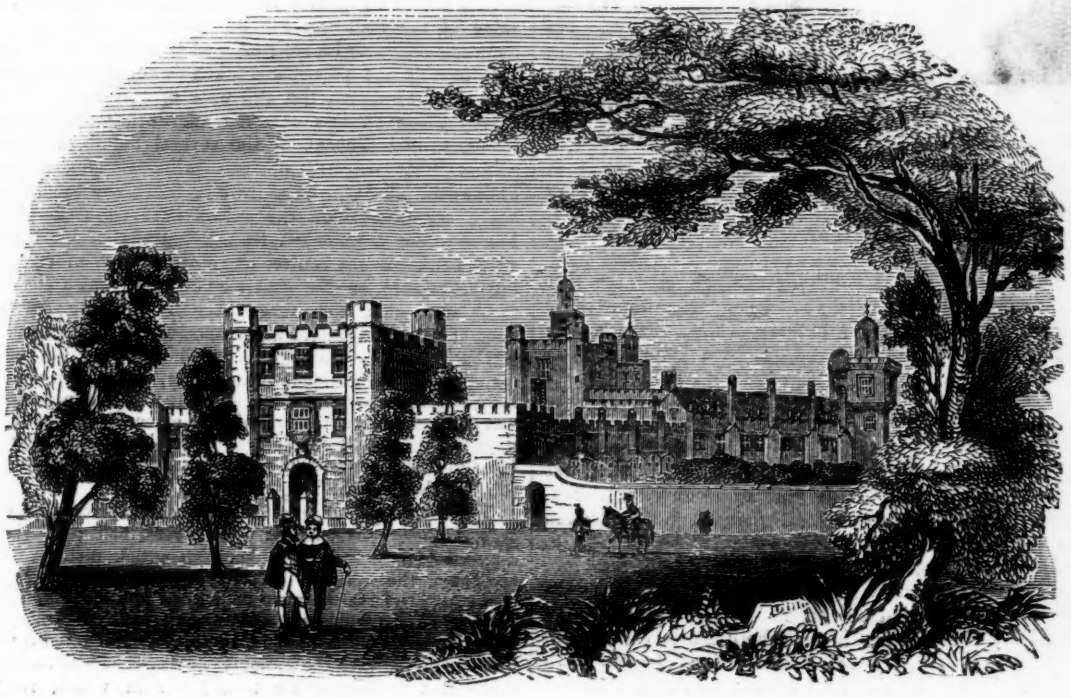


THE ROYAL PALACE OF THEOBALDS.

The house itselfe doth showe the owner's wit,
And may for bewtie, state, and every thing,
Compared be with most within the land.—VALLANS.

THE magnificent Palace of Theobalds, which owed its extent and importance to the progresses of Queen Elizabeth, stood in the parish of Cheshunt, at the distance of twelve miles from London, and a little to the north of the road to Ware. The first mention of the manor of "Thebaudes," as it was anciently called, was in 1441, when it was granted by the crown to the hospital of St. Anthony, in London. The origin of the name of Theobalds is not known; but it was probably given after some former owner, and the manor may have reverted to the crown at the suppression of religious foundations. Subsequently it passed through various hands until it was purchased, on the 10th of June, 1563, by Sir William Cecil, afterwards Lord Burghley.

The original manor-house is supposed to have been on a small moated site still visible; but the building erected by Lord Burghley was on a much grander scale, and was in a state to receive the queen in 1571, when her majesty visited Theobalds, and was presented with a "portrait of the house." Lord Burghley was a builder on a magnificent scale, and his three dwellings are thus noticed by the author of his contemporary biography.

He buylt three houses; one in London for necessity; another at Burghley, of competency for the mansion of his barony; and another at Waltham [this of Theobalds], for his younger sonne; which at the first he meant but for a little pile, as I have hard him saie, but after he came to enterteyne the quene so often there, he was inforced to enlarge it, rather for the quene and her greate traine, and to sett poore on worke, than for pompe or glory; for he ever said it would be to big for the small living he cold leave his sonne. The other two are but convenient, and no bigger than will serve for a nobleman; all of them perfected, convenient, and to better purpose for habitation then manie others buylt by great noblemen; being all beautiful, uniform, necessary, and well seated: which are greate arguments of his wisdome and judgment. He greatlie delighted in making gardens, fountains, and walks; which at Theobalds were perfected most costly, bewtyfully, and pleasantly; where one might walk twoe myle in the walks before he came to their ends.

The accuracy of this account is proved by a letter written by Lord Burghley to an intimate friend, in which he complains that some persons consider his extensive building as a folly. He justifies himself therefore by saying that as to his old house in Westminster, many had lately been built larger by far, both in city and country. Yet, he says, the building thereof cost him the sale of lands in Staffordshire, which he had from the good King Edward, and which had yielded him one hundred pounds yearly income. Then of his house of Burghley he declares that it is his mother's inheritance, who lives and is the owner of it, he being nothing more than the farmer or steward of it. Also that in that house he had set his walls upon the old foundation, and left one side of the walls just as he found it; and that doubtless his son would be able to maintain that house, considering that there were in that shire a dozen larger, of men under his degree. Yet in his house at Theobalds he is disposed to confess his folly in the expenses, "because," says he, "some of my houses are to come, if God so please, to them that shall not have land to mayntayne them: I mean my house at Theobalds; which was begun by me with a mean mesure, but

increast by occasions of her majesty's often coming; whom to please I never would omit to strain myself to more charges than building is. And yet not without some speciall direction of her majesty. Upon fault found with the small mesure of her chamber, (which was in good mesure for me,) I was forced to enlarge a room, for a larger chamber, which need not be envied of any for riches in it, more than the show of old oaks, and such trees, with painted leaves and fruit."

The tourist Hentzner visited the palace of Theobalds when it was in its full beauty, and though he did not get a view of the apartments, his description gives some idea of the fashion of the grounds in those days. He speaks of the garden as being encompassed with water "large enough for one to have the pleasure of going in a boat, and rowing between the shrubs." In this garden were labyrinths constructed with a vast deal of labour, trees and plants in great variety, a jet d'eau, with a basin of white marble, and columns and pyramids of wood. There was also a summer-house, in which were twelve figures in white marble, of the Roman Emperors, and in the middle a table of touchstone. In the upper part of this summer-house were large cisterns of lead, into which water was conveyed through pipes, so that fish might be kept in them. In summer time these reservoirs were used for bathing. Near this summer-house was a second, joined to it by a little bridge, in which there was a noble table of red marble.

Lord Burghley died in 1598, and Theobalds and the neighbouring estates fell into the possession of his son Sir Robert Cecil, who became Earl of Salisbury soon after the accession of King James. The king was sumptuously entertained at this palace on several occasions, and so great was his satisfaction, that he desired to become possessed of this noble residence, and to make it his principal place of abode. It was therefore agreed that Salisbury should give up his inheritance to the king, and should receive in exchange the palace of Hatfield, where in fact he soon built a mansion of still greater splendour, which has remained to our own times. The preamble to the act of parliament by which this exchange was ratified runs thus: "Whereas the mansion-house of Theobalds, in the county of Hertford, being the inheritance of Robert Earl of Salisbury, as well for situation in a good and open aire, and for the large and goodlie buildings and delight of the gardens, walkes, and park replenished with redd fallowe deere, as also for the neereness to the citie of London northward, and to his majestie's forest of Waltham Chase, and Parke of Enfield, with the commoditie of a navigable river falling into the Thames, is a place soe convenient for his majestie's princely sportes and recreation, and so commodious for the residence of his highnes court and entertaynment of forrayne princes, or their ambassadors, upon all occasions, as his majesty hath taken great likinge thereunto, of which the said earl having taken particular knowledge, although it be the only dwelling-house left unto him by his father, most willinglie and dutifullie made offer thereof unto his highness, with any such other his manors and lands thereunto as should be thought fit for his majesty's use, preferring therein his majesty's health and contentation before any private respect of his owne; which offer his majesty hath gratiously forborne to accept, without a full and princely recompense to the said earl," &c.

Accordingly, on the 22nd of May, 1607, the possession of Theobalds was given up to the king, who afterwards made it his principal country residence. Windsor, Richmond, and Hampton Court were occasionally visited, but the monarch was evidently much attached to Theobalds throughout the course of his reign, and there at length he breathed his last on the 27th of March, 1625.

Charles the First also made the palace of Theobalds his chief residence, and an interesting picture is still extant which represents the interior of the gallery at Theobalds, into which the King and Henrietta Maria are entering at a door, ushered by the brother Earls of Pembroke and Montgomery, each with his wand of office, the former as lord steward, the latter as lord chamberlain of the king's household. Waiting in the gallery stands the dwarf Jeffery Hudson, with three of the king's favourite spaniels; and a parroquet is perched on a balustrade.

When the sale of the crown lands was determined on, Theobalds was at first excepted, yet afterwards its doom was fixed. The surveyors employed by Parliament to estimate its condition and value, reported that it was an excellent building, in very good repair, and by no means fit to be demolished; yet supposing the Parliament should decide on taking it down, their estimate of the value of the materials was 8275*l.* 11*s.* This was too tempting a sum to be resisted, and therefore the greater part of this fine palace was taken down, and the materials sold to defray the expenses of the army. The survey made on this occasion affords a valuable and circumstantial account of the several buildings of the palace. It consisted of two principal quadrangles, besides the Dial-court, the Buttery-court, and the Dove-house court, in which the offices were situated. The Fountain-court, so called from a fountain of black and white marble in the centre, was a quadrangle of eighty-six feet square, on the east side of which was a cloister eight feet wide, with seven arches. On the ground floor of this quadrangle was a spacious hall, paved with Purbeck marble, the roof "arched over the top with carved timbers of curious workmanship, and of great worth, being a goodlie ornament to the same;" at the upper end was "a very large picture of the bignesse of a pair of stagges hornes seen in France." On the same floor were the Lord of Holland's, the Marquis of Hamilton's, and the chamber for the king's waiters.

The king's presence chamber was a fine room on the second floor, "wainscotted with carved oak, painted of a liver colour, and richly gilded with antick pictures over the same, the seelinge full of gilded pendants hanging down, setting forth the room with great splendor; as alsoe with very large windowes, and severall coates of arms sett in the same." On the same floor were several other apartments, and likewise the gallery, one hundred and twenty-three feet in length by twenty-one in width, richly ornamented with paintings.

On an upper floor were the Lord Chamberlain's apartments, and near them were two walks on the leads of the building, each sixty-two feet in length, and eleven in width, which commanded a fine view. The queen's chapel and apartments were to the south of the central quadrangle. The prince's apartments were to the north.

The park contained 2508 acres, valued, together with six lodges, at 1545*l.* 15*s.* 4*d.* per annum. The deer were valued at 1000*l.*, the timber at more than 7000*l.*, exclusive of that marked for the use of the navy; the materials of the barns and walls were valued at 1570*l.* 16*s.* 3*d.*

After the Restoration the manor was granted to George, duke of Albemarle. The park and ruins remained with the crown until granted to William, duke of Portland, and his heirs. In 1763 they were sold to George Prescott, Esq., the ancestor of the present proprietor. The room in which James the First died, and a parlour beneath it, were standing in 1765, when the site was cleared for the present building. The only traces of ancient grandeur now remaining are, according to Gough, "a walk of abeles between two walls, a circular summer-house, and the traces of a park wall, nine or ten miles round, built by James the First."

The particulars thus given were diligently collected by a writer in the *Gentleman's Magazine* a few years ago, from whose account we have abridged as much as was necessary for our purpose.

THE flattery of others would not injure us if we did not flatter ourselves.

THE passions which the world praises and inspires are followed by its contempt; the virtue that the world censures and opposes attracts its homage.—MASSILLON.

ON THE DURABILITY OF STONE BUILDINGS.

II.

An easy method of determining whether a Stone will resist the action of Frost.

In the choice of a stone for building purposes it is of the utmost importance to be able to determine by a few prompt and easy experiments whether the proposed stone is capable of resisting the destructive action of moisture and frost. The means of ascertaining this were difficult and uncertain until M. Brard several years ago communicated his method to the Royal Academy of Sciences at Paris. This learned body having appointed a committee of their own members to inquire into the merits of M. Brard's process, and to make a report thereon, the united testimony of engineers, architects, masons, and builders from different parts of France was received, and proved so favourable as to its merits and simplicity, that the committee recommended the plan to public notice and general adoption. From their report we select a few details which hitherto, we believe, have not appeared in English.

When water is converted into ice an increase in bulk suddenly takes place with such amazing force that it appears to be almost irresistible. This is the force which cracks our water bottles and ewers; splits asunder the trees of our forests; and destroys some of the stones of our buildings. But the action of frost upon stone is very gradual; it is confined to the surface, and when we see a layer of stone separated from the rock or the building, we see the result of the action of the frost during several successive winters, whereby the fragment is gradually thrust out of its perpendicular position, and at length falls. This natural process is repeated in our buildings: we rarely see squared stones split into large fragments by the action of frost except there be a cavity of some considerable size, in which a quantity of water can be collected. The usual action of the frost is at the surface, which is destroyed by the chipping off of small fragments in consequence of the adhesion of the materials of the stone being partially destroyed.

All stones absorb water in greater or less quantities, and there is no rock that does not contain some humidity. The great difference between stones which is now to be considered is in their power of resisting frost. Stones of the same kind, nay stones from different parts of the same quarry, are acted upon very differently by frost; for while one stone soon begins to show the destructive effects of its action, another remains uninjured during many centuries. It will therefore be convenient in this article to call those stones, of whatever kind, which withstand the action of frost, *resistant*, and those which yield to its action, *non-resistant*.

M. Brard's first idea in order to test these resistant properties in building stones was to saturate the stone with water, and then expose it to cold artificially produced; but this was found to be impracticable on a large scale, and the freezing mixtures and other means of producing cold were liable to act chemically upon the stone, and thus produce other effects than those of cold.

M. Brard was then led to compare water with those numerous solutions of the chemist, which, under certain modes of treatment, crystallize. The expansive force of salts in crystallizing is very great, and he saw no reason why water should not be regarded as a crystalline salt similar in its nature to those saline bodies which effloresce at the surfaces of stones, and in time destroy them and even reduce them to powder.

He therefore tried, in a very large number of experiments, the action upon building stones of solutions of nitre, of common salt, of Epsom salts, of carbonate and sulphate of soda, of alum and of sulphate of iron, and found that the stones cracked and chipped, and in many cases behaved precisely in the same way as when under the influence of freezing water. In the course of these trials sulphate of soda (Glauber's salts) was found to be the most energetic and active; and to be the best exponent of the action of freezing water.

In order therefore to determine promptly if a stone be resistant or non-resistant, the following process was adopted. A saturated solution of sulphate of soda was made in cold water: the solution being put into a convenient vessel, the stone was immersed, and the solution boiled during half an hour: the stone was then taken out and placed in a plate containing a little of the solution. It was then left in a cool apartment, in order to facilitate the efflorescence of the salt with which the stone was now impregnated. At the end of about twenty-four hours the stone was covered with a snowy efflorescence, and the liquid had disappeared either by evaporation or by absorption. The stone was then sprinkled gently with cold water until all the saline particles disappeared from the surface. After this first washing the surfaces of the stone were covered with detached grains, scales, and angular fragments, and the stone being one that was easily attacked by frost, the splitting of the surfaces was very marked. But the experiment was not yet terminated: the efflorescence was allowed to form, and the washing was repeated, many times during five or six days, at the end of which time the bad qualities of the stone became fully established. The stone was finally washed in pure water; all the detached parts were collected, and by these the ultimate action of the frost upon the stone was estimated.

The behaviour of various non-resistant stones under this process was remarkable. Some were found to have deteriorated in the course of the third day; others to have entirely fallen to pieces; those of which the power of resistance was somewhat greater, held out till the fifth or sixth day; but few stones except the hard granites, compact limestones, and white marbles, were able to stand the trial during thirty consecutive days. For all useful purposes, however, eight days suffice to test the resistant qualities of any building stone.

The explanation of this process is very easy. The boiling solution dilates the stone and penetrates it to a certain depth, nearly in the same way that rain water by long-continued action introduces itself into stones exposed to the severity of our changeable climate. Pure water when frozen occupies a greater bulk than when fluid, and the pores or cellules of the stone not being able to accommodate themselves to the increased bulk of the water, great pressure is exerted between and among them, whereby a portion of the water is driven to the surface, and in doing so rends and detaches small portions of the stone. The same action takes place with the saline solution; it is introduced into the stone in a fluid state, from which passing into the solid it occupies a greater bulk, and a portion of it appears at the surface. The repeated washings have no other object than to allow the salt to exert its greatest amount of destructive action upon the stone. There is a striking analogy between the effect of congealed water and that of the efflorescence of salts, in the disintegration of non-resistant stones; namely, that pure water acts on the stones destructively only in a state of snowy efflorescence, which evidently proceeds from the interior to the exterior like the saline efflorescence; whilst water at the surface of the stones may freeze into hard ice without injuring them, just in the same way as salts, which may crystallize upon stones without exerting any injurious action.

The experience of several engineers, extending as it does over several years, fully proves of a large variety of stones whose qualities were well known, that the action of M. Brard's process and that of long-continued frost exactly coincide.

It is not the least interesting part of the inquiry to know that this process may be applied with perfect success to ascertain the solidity and resistant power of

bricks, tiles, slates, and even mortar. From a mass of minute detail we will select a few general results.

During one winter season M. Vicat composed seventy-five varieties of mortar, the difference between any two consisting in the proportion of sand and the method of slaking the lime. In the following June these mortars were exposed to the disintegrating process. Most of them were attacked in twenty-four hours; almost all of them in forty-eight hours; and all except two in three days. This gentleman also found that a mortar made ten years previously, of one hundred parts lime which had been left exposed to the air, under cover, during a whole year, and then mixed up into a paste with fifty parts of common sand, withstood the trial admirably during seventeen days, while the best stones of the neighbourhood speedily gave way. In this case the solution was saturated while hot, which is so powerful in its effects that stones which have resisted the action of the frost for ages soon give way when exposed to it.

M. Vicat calculates that the effect of the sulphate of soda upon a non-resistant stone after the second day of trial equals a force somewhat greater than that exerted by a temperature of about 21° Fahrenheit, on a stone saturated with water.

The action of the process upon bricks proved that, whatever their qualities in other respects, if imperfectly burnt, they are speedily acted on. The sharp edges of the brick, and then the angles, are first rounded, and finally the brick is reduced to powder. Such is precisely the action of frost often repeated. Well-baked bricks, on the contrary, retain their colour, form and solidity by this process, as well as under the influence of frost. Ancient Roman bricks, tiles, and mortar, and hard well-baked pottery, resisted the process perfectly; as did also white statuary marble of the finest quality, while common white marble was soon attacked. In Paris portions of buildings which had been exposed to the air during twenty years without undergoing the least alteration were submitted to this ordeal, and the experiment agreed with observation. In one extensive series of experiments on stones from different quarries of France, the action of the salt was continued for seven days, and the results noted down; it was then continued for fourteen days, and the results compared with the preceding ones; which only served to confirm the judgment first given, for those stones which were noted as of bad quality crumbled to dust or split into fragments, while those noted for their good qualities had experienced no sensible alteration.

One of the great advantages of this process is the power it gives to the architect of choosing a hard, durable stone for those parts of the building most exposed to the action of the weather, when the funds are insufficient to admit of the whole building being so constructed. Thus the cornices, the columns, and their capitals, are struck in all directions by rain, and hail, and damp air, and are consequently far more exposed to their destructive action than the flat surface of a wall, which offers but one plane to the air.

In the course of this inquiry a very curious case arose. During the erection of a church in Paris the architect required a good durable stone for the Corinthian capitals; and many circumstances disposed him to select it from the neighbouring quarry of the Abbaye du Val. But on seeking the opinion of two brother architects he was surprised to find their estimations of the stone to be totally at variance, for while one declared that he had employed it with the greatest success, another said that he had seen it yield speedily to the effects of frost. On visiting the quarry it was found that two beds of stone were being worked, an upper and a lower bed; specimens of the stone were taken from each, and on submitting them to a hot saturated solution, it was ascertained almost immediately that the upper layer furnished excellent stone, while the lower one supplied that of which the architect had so much reason to complain. But it is remarkable that the stones from the two beds had precisely the same appearance in grain, colour, and texture; so much so, that when brought into the mason's yard it was impossible by ordinary tests, to distinguish the good from the bad stone.

At the conclusion of the inquiry of the committee, the Royal Academy of Sciences proved the high estimation in which they held this contribution of science to the useful arts, by directing to be published the following practical directions for repeating the process, for the use of architects, builders, master masons, land proprietors, and all persons engaged in building.

1. The specimens of stone are to be chosen from those parts of the quarry where from certain observed differences in the colour, grain, and general appearance of the stone, its quality is doubtful.

2. The specimens are to be formed into two-inch cubes, carefully cut, so that the edges may be sharp.

3. Each stone is to be marked or numbered with Indian ink or scratched with a steel point; and corresponding with such mark or number a written account is to be kept as to the situation of the quarry, the exact spot whence the stone was detached, and other notes and information relating to the specimen.

4. Continue to add to rain or distilled water, a quantity of sulphate of soda until it will dissolve no more, You may be quite sure that the solution is saturated, if, after repeatedly stirring it, a little of the salt remains undissolved at the bottom of the vessel an hour or two after it has been put in.

5. This solution may be heated in almost any kind of vessel usually put on the fire, but perhaps an earthen pipkin may be most convenient. When the solution boils put in the specimens of stone, one by one, so that all may be completely sunk in it.

6. Continue the boiling for thirty minutes. Be careful in observing this direction.

7. Take out the cubes one at a time, and hang them up by threads in such a way that they may touch nothing. Place under each specimen a vessel containing a portion of the liquid in which the stones were boiled, having first strained it to remove all dirt, dust, &c.

8. If the weather be not very damp or cold the surfaces of each stone will, in the course of twenty-four hours, become covered with little white saline needles. Plunge each stone into the vessel below it, so as to wash off these little crystals, and repeat this two or three times a day.

9. If the stone be one that will resist the action of frost, the crystals will abstract nothing from the stone, and there will be found at the bottom of the vessel neither grains, nor scales, nor fragments of stone. Be careful in dipping the stone, not to displace the vessel.

If, on the contrary, the stone is one that will not resist the action of frost, this will be discovered as soon as the salt appears on the surface, for the salt will chip off little particles of the stone, which will be found in the vessel beneath; the cube will soon lose its sharp edges and angles; and by about the fifth day from the first appearance of the salt the experiment may be considered at an end.

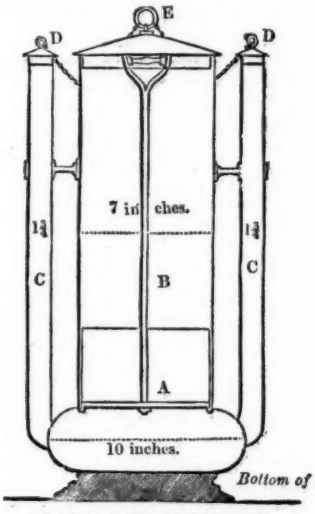
As soon as the salt begins to appear at the surface its deposit is assisted by dipping the stone five or six times a day into the solution.

10. In order to compare the resisting powers of two stones which are acted upon by the frost in different degrees, all that is necessary is, to collect all the fragments detached from the six faces of the cube, dry them and weigh them, and the greatest weight will indicate the stone of least resistance to the frost. Thus if a cube of twenty-four inches of surface loses 180 grains, and a similar cube only 90 grains, the latter is evidently better adapted than the former to the purposes of building.

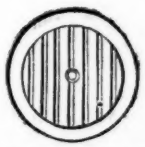
EASY METHOD OF HEATING BATHS.

The Italian method of heating baths, described in a notice of the state of the mechanical arts in Italy*, has excited the curiosity of several correspondents on account of its great simplicity and ingenuity. Having been applied to for the dimensions of the bath-heater, we repeat the figure, with the necessary measurements, and doubt not that this ingenious instrument will ere long be in use in this country.

The diameter of the copper cylinder is seven inches; the space below the charcoal at A is ten inches; the tubes C C for the supply of air are one inch and three-quarters in diameter. The height of the apparatus must be regulated by the depth of the bath.



ITALIAN COPPER BATH-HEATER.



PLAN OF CAST-IRON GRATING FOR FIRE AT A.

* See *Saturday Magazine*, Vol. XXIII., p. 229.

ON THE BETTER PRESERVATION OF COTTAGES.

The care taken of cottages and gardens affords an excellent test of the character of the labourers. I have paid especial attention to those labourers who have displayed cleanliness and order; and I pay the most respect to those who have achieved a situation of the greatest comfort, and keep themselves and their houses cleanly, and their children tidy. Formerly my cottages were in bad order, their pavements and windows were broken. I had them all paved, and the windows glazed. I told the cottagers I did not like to see shabby, broken windows, with patches of paper and things stuck in, or broken pavements which they could not clean. I engaged, after the cottages were thoroughly repaired, to pay one pound a year for repairing them. I undertook to make the repairs myself, and deduct the expense from this one pound; but if no repairs were wanted, they were to have the whole pound themselves. This course has, I find, formed habits of care; and their cottages are now so well taken care of, that very little deduction is made annually from the pound. Formerly they used to chop wood carelessly on their pavements, and break them; now they abstain from the practice, or do it in a careful manner, to avoid losing the money. In the winter I give them two score of fagots towards their fuel. I have found that by this means I save my hedges and fences, and am pecuniarily no loser, whilst pilfering habits are repressed. Since the inclosures have been made, I think some place should be provided for the exercise and recreation of the working classes. I have set out four acres as a play-ground for the children, or whoever likes to play. Sheep and cows feed on it, so that it is no great loss to me. I let it for 4*l.* a-year to a man, on condition that he cuts the hedges and keeps it neat. Many persons accuse the poor of ingratitude, but I find them the most grateful people alive for these little attentions; and what do they cost me? why, not more altogether than the keep of one fat coach-horse.—*Correspondent in Sanitary Report.*

THE NATURAL HISTORY AND MANAGEMENT OF CAGE-BIRDS.

II.

The Goldfinch *(Fringilla carduelis.)*

I love to see the goldfinch twit and twit,
And pick the groundsel's feathered seeds;
And then, in bower of apple-blossom perch'd,
Trim his gay suit, and pay us with a song.—Hurdis.

The bright plumage of the goldfinch, and the lively manners of the bird, are perhaps as much the cause of the estimation in which it is held, as the pleasing nature of its song. Buffon says, "Beauty of plumage, softness of voice, quickness of instinct, remarkable cleverness, proved docility, tender affection, are all united in this delightful little bird; and if it were rare, or if it came from a foreign country, it would then be valued as it deserves."

The song of the goldfinch is sweet and melodious, but not so rich and varied as that of some other members of the same family. It is carried on with little intermission throughout the year, being only discontinued at the moulting season. Bechstein describes it as consisting of blended tones and harmonies, more or less dwelt upon, and says that the oftener the sound "*fink*" is introduced, the more is the bird prized in his country. Some goldfinches utter this sound only once or twice in their strains, while others will repeat it four or five times following.

This bird is not so easily taught to imitate the song of others as the linnet or the canary; but it is remarkably docile, and with attention on the part of the teacher it may be made to repeat tunes from the flageolet, or to acquire the notes of its companions. Yet it is not worth the pains of the teacher, or the effort of the bird, thus to substitute artificial strains for the pleasing natural melody it pours forth. Various tricks are sometimes taught to goldfinches, which are equally trifling, and do not really enhance the value of the bird. Thus they have been seen to let off a small cannon, and to imitate death. They have also been instructed to draw up their food and water by means of a chain or pulley, furnished with a soft leather band, having four holes, through which the wings and feet are passed. The ends of this band meet under the belly, and are fastened by a ring, to which the chain is attached. At the end of the latter is the bucket containing food or water. Bechstein, describing this contrivance, says that "whenever the little waterman wants either, he draws up the chain with his beak, fixing it at intervals with his foot, and thus succeeds in obtaining what he wishes; but if his little buckets are suspended to a pulley, raising one makes the other descend, and he can only enjoy his food and water in turn."

But it is not the trained and tutored goldfinch that the lover of nature looks on with pleasure; it is the happy, sportive, beautiful being whose golden plumage glitters in the sunbeams, and whose light and elegant form may be seen

Now in orchards gaily sporting,
Now to flowery fields resorting;
Chasing now the thistle's down,
By the gentle zephyr blown.

The goldfinch is very generally distributed in Britain wherever the supply of its favourite food is to be met with. It is also common throughout Europe, frequenting gardens, orchards, and copses, and also mountainous districts, if partially under cultivation. In autumn goldfinches assemble in parties, and visit those districts where thistles most abound. There they labour with the utmost assiduity, greedily devouring the seeds of the plants, and rendering a great service to the farmer. The chief food of these birds consists of the seeds of plants that are injurious to corn-fields and pastures, and therefore they should ever meet with the protection of the careful cultivator. These birds are said to keep to the same haunts winter and summer; but it is certain that in some parts of the country a partial migration

takes place. In Derbyshire, for instance, it is asserted that scarcely a goldfinch is seen from the middle of autumn until the ensuing spring. Before the end of April they again make their appearance, and soon become abundant.

The nest of the goldfinch is constructed with care and neatness, and is frequently placed among the foliage of evergreens, or on the weak branches at the top of orchard trees. The song of the male bird is in its greatest perfection in the month of May, and continues with little intermission from sun-rise to sun-set. The materials used in building the nest seem to be just those which are the nearest at hand, and the most suitable for the purpose. Fine moss, lichens, stalks of grass and slender twigs are nicely interwoven to form the framework, and this is lined with wool, horse-hair, willow-down, &c. To show that the birds take the most convenient materials within reach, a naturalist relates that when a pair of goldfinches had formed the ground-work of their nest of moss and dried grass, he scattered wool in the garden, and they immediately left off using the other materials and employed the wool. The next day he gave them cotton, and on the third day supplied them with down, and he found that on each occasion they took the new material and carried on their work with it, forsaking that which they had previously used.

The goldfinch weaves with willow-down inlaid,
And cannach-tufts*, his wonderful abode;
Sometimes suspended at the limber end
Of plane-tree spray, among the broad-leaved shoots,
The tiny hammock swings to every gale;
Sometimes in closest thicket 'tis concealed,
Sometimes in hedge luxuriant, where the brier
The bramble, and the plum-tree branch,
Warp through the thorn, surmounted by the flowers
Of climbing vetch and honeysuckle wild.

An instance of sagacity is given in the case of a pair of goldfinches who had built their nest on a branch that was too slender to afford proper support for their brood. When the young birds were hatched, the parents perceived that the weight of the growing family was too great for the branch, for they actually found it giving way. In this emergency, and to save their nest from falling, they were observed to interlace the bending twig with a stronger branch that was near it, and to secure their work by means of a piece of small string which they had picked up.

A flexible branch is generally chosen for the nest, which is therefore literally a cradle; yet in the most tempestuous weather the female sits closely on her eggs, without regard to the violent rockings to which she is exposed. The male is very attentive, and sings assiduously to his mate.

Hid among the opening flowers
Of the sweetest vernal bowers,
Passing there the anxious hours
In her little mossy dome,
Sits thy mate, whilst thou art singing,
Or across the lawn seen winging,
Or upon a thistle swinging,
Gleaning for thy happy home.

It may perhaps be thought that the above lines are only applicable to the later broods of goldfinches, since in the early spring, the usual nesting-time, the thistle has produced neither flower nor seed for the supply of this bird. But in the neighbourhood of waste lands, where thistles are very abundant, it will be found that there is a supply for the goldfinch nearly all the year round. The autumnal thistles retain a portion of their seed until the spring, so that the wind has not shaken them all bare until the groundsel, the dandelion, and other plants have arrived to take their place. Thus, although the supply of thistle-down and seed is smaller in the spring than at any other period, yet in particular districts, sheltered from violent winds and abounding in thistles goldfinches may still employ this favourite material in building their nests, and the elder naturalists, who have been considered in error when they spoke of thistle-down as the lining of the nest, may have been perfectly accurate in their descriptions. The sources whence the goldfinch gains his winter supply of thistle-seeds are thus noticed by a popular writer.

The numbers of those seeds are beyond all counting; and the means with which they are furnished for floating about with the lightest wind that stirs, are most effective: they are, at the same time, fitted for laying hold, and their oily nature renders them not easily destructible by the weather. Hence they are everywhere; and one who examines the quantity of down that floats off from a single bed in a neglected garden, must see that one acre of cultivated land allowed to run to waste would suffice to infest a whole parish. It is a maxim in farming that where the hedges and lanes are foul, the fields never can be clean; and countless instances may be seen in England, and in Middlesex not less than in more remote places, where the farmer gives half of what his land might produce to the weeds, just because he will not grub up some green lane or inconvenient corner, but retains it as an ever-productive nursery of the most productive species. But though these accumulations of unseemly plants spoil or diminish the harvest of the farmer, they yield an ample autumnal and winter supply for the goldfinches, and the margin of the wild is often made gay with the colours and song of the goldfinch, simply because the farmer on the richer ground is a sloven.

As if conscious of the essential service it performs, the goldfinch trusts to the protection of man, and nestles near his dwelling. It has also been known to show considerable boldness and confidence in such situations. An empty cage being left open in a passage entrance to a house in a country town, a goldfinch was one morning found in it, feeding upon the seeds which had been placed for the former occupant. The door was closed upon the bird; but as it appeared to be a female, it was shortly let out again. In about two hours it returned, was again shut in, and then released as before. A few days afterwards the bird came back, accompanied by her mate. She entered the cage, and fed as usual, but her companion sat on the outside wires, and then flew to a neighbouring tree. Several weeks now elapsed, and the circumstance was almost forgotten, when the goldfinch again made her appearance, accompanied not only by her former companion, but by four full-grown young ones. She entered the cage and fed as usual, but she could not induce her brood to follow her example. Finally she went off, and from that time was never seen again.

The majority of the goldfinches kept in cages have been reared from the nest, or put into a cage when just fledged, and fed by the parents. A square cage is recommended for these birds in preference to a round one, as they dislike the swinging motion caused by the latter. If allowed to run on the floor, a small artificial tree should be provided for the birds as a roosting-place. The goldfinch seldom appears so happy in a cage as the linnet or canary. It flutters against the wires, or betrays by incessant hoppings to and fro, its impatience of confinement. In order to cure it of this fluttering, it is sometimes confined in a small trap-cage, two or three inches square, until the habit is overcome. But the better way, in all cases where it is practicable, is to give this restless bird the run of a room or aviary, where it may indulge its active disposition.

The goldfinch is a hearty feeder. In the wild state it subsists on various kinds of small seeds, such as those of the thistle, dandelion, lettuce, goat's-beard, radish, chick-weed, groundsel, &c. In the house it is fed with poppy, canary, and hemp-seed, varied with lettuce and rape-seed. Green food must be given occasionally, such as chick-weed, water-cresses, lettuce, or endive. Bechstein says, "I have a goldfinch which appears in good health, and eats not only of all the vegetables brought to table, but also meat, though in their wild state these birds never touch insects." When kept in a room with other birds, the goldfinch endeavours to keep possession

* The spikes of the Cotton-grass, *Eriophorum*.

of the seed box, driving off, if he can, any of his companions who wish to share its contents.

Several of our naturalists speak of the goldfinch as producing three broods in the year, but the experience of Bechstein is opposed to this. He describes the female as rarely producing more than one brood in the year, unless she has been disturbed, and then the number of eggs is diminished. On this account, goldfinches never appear to increase in number. The eggs are bluish-white, spotted with red, and having black streaks, with sometimes a circle at the large end. The young may be reared on poppy-seed and the crumb of white bread soaked in milk or water. If it is wished to take only the male birds from the nest, all those which have a whitish ring round the root of the beak must be left.

One of the commonest diseases of the goldfinch is epilepsy, for the cure of which the following is Bechstein's plan. "Plunge the sick birds every now and then into cold water, letting them fall suddenly into it, and cutting their claws, or at least one or two, short enough for the blood to run. From bleeding giving so much relief one would think that this disease is a kind of apoplexy occasioned by want of exercise, and too much food. Bullfinches and thrushes are more subject to it than any other birds, and bleeding always cures them. I have seen this done with great success in the following manner, but much delicacy and skill are required, as there would be great danger of laming the bird:—A very small hole is made on the surface of the claw, with a lancet or very sharp penknife; it is then plunged in lukewarm water, and if the operation be well done the blood runs like a thread of red silk; when removed from the water the bleeding stops: no bandage or dressing is required."

The goldfinch is fond of bathing, and should be supplied with the means of doing so daily during the spring and summer months. In the middle of winter it would do the same; but it is only on very warm days that the practice should be allowed at that season, as it may take cold and die from using the water on frosty days. These birds become blind in old age and also lose their beautiful colours, but with care they may be kept sixteen or even twenty years. A goldfinch mentioned by the eminent naturalist Gesner lived to the age of twenty-three years, but at last grew so infirm that its owner was obliged to scrape its claws and beak, that it might take food, and support itself on its perch. It had lived chiefly on poppy-seed, and had lost its power of flying. The plumage, instead of changing to a darker hue, as is commonly the case, became quite white. The use of hemp-seed is found to have the effect of making the plumage darker, and this seed is eaten greedily by the birds even when they are in a dying state. But this only hastens their death, and must be considered very improper food for delicate or sick birds. Small quantities of canary-seed, plenty of groundsel, chick-weed, and lettuce, with thistle-heads, when they can be procured, will afford the best supply for ailing birds.

The goldfinch has many enemies. The situation of the nest often makes it the prey of cats, and the beauty and value of the birds lead to an earnest search on the part of bird-nesting boys. There is a great demand for the goldfinch as a cage-bird, and a fine male usually sells for five or six shillings, though when first caught they do not fetch so high a price. These birds in some cases become tame and familiar in confinement; as an instance of this, we may give the case mentioned by the translator of Bechstein's work. "Madam —— had a goldfinch that never saw her go out without making every effort in his power to quit his cage and follow her, and welcomed her return with every mark of extreme delight; as soon as she approached, a thousand little actions showed his pleasure and satisfaction: if she presented her finger, he caressed it a long time, uttering a low joyous murmur. This attachment was so exclusive that if his mistress, to prove it, substituted another person's finger for her own, he would peck it sharply, whilst one of his mistress's placed between two of this person's would be immediately distinguished, and caressed accordingly."

EASY LESSONS IN CHESS.

XXI.

The Lopez Gambit.

The Lopez Gambit, so called in honour of Ruy Lopez* the celebrated Chess player and writer, was first described in his treatise published in 1561. Some writers regard it merely as a variation of the ordinary King's Bishop's game†; it is, however, a true gambit, a Pawn being sacrificed early in the game by the first player, for the sake of position. It is a safe opening for the first player, because, unlike most of the gambits hitherto considered, the second player cannot capture the Gambit Pawn without getting an inferior game, nor can he conduct the defence after the manner of an ordinary Gambit, as will be proved by the first example given, of this opening.

WHITE.	BLACK.
1. K. P. two squares.	1. K. P. two squares.
2. K. B. to Q. B. fourth square.	2. K. B. to Q. B. fourth square.
3. Q. to K. second square.	

If Black play Q. B. P. one square, you take his K. B. P. with your K. B. checking, and then play Q. to Q. B. fourth square, recovering the B. Black has a choice of several moves, but suppose he play

3. Q. P. one square.

4. K. B. P. two squares.

You thus resolve the game into the Lopez Gambit. Black has several moves, but in the present game he proceeds as in the defence of an ordinary gambit, which gives him a very inferior position, because by playing out the K. B. at the second move he is a move behindhand, compared with his position in the ordinary King's Gambit.

	4. P. takes P.
5. K. Kt. to K. B. third square.	5. K. Kt. P. two squares.
6. Q. P. two squares.	6. B. to Q. Kt. third square.
7. K. R. P. two squares.	

He cannot of course advance K. R. P. one square; if he move K. B. P. one square, you take K. Kt. P. with your Kt. and then play Q. to K. R. fifth square, winning easily: therefore he plays

	7. K. Kt. P. one square.
8. K. Kt. to Kt. fifth square.	8. K. Kt. to K. R. third square.

You have a very fine position, and with ordinary care ought to be able to win easily.

The following game from Greco is well calculated to illustrate the powerful and peculiar attack acquired by the first player, when the defence is weak or injudicious. The moves of the second player are very likely to be made by one unacquainted with this form of Gambit.

1. K. P. two squares.	1. K. P. two squares.
2. K. B. to Q. B. fourth square.	2. K. B. to Q. B. fourth square.
3. Q. to K. second square.	3. Q. to K. second square.
4. K. B. P. two squares.	4. K. B. takes K. Kt.
5. K. R. takes K. B.	5. K. P. takes P.

It is very natural in the second player to take this Pawn, but the present game will furnish another instance of its impropriety. Q. P. one square would have been a much better move.

6. Q. P. two squares.

You thus occupy the centre of the board with your pawns, and open a path for your Q. B.

6. Q. to K. R. fifth square chg:

This check is not judicious. He cannot win your K. R. P., because by advancing your K. Kt. P. you defend it with your Q. Indeed, it is in anticipation of this check that it is usual in this gambit to play Q. to K. second square at the third move. Instead of this check Black ought to have played Q. P. one square, or K. Kt. or Q. K. to B. third. He ought, in fact, to get out his pieces, and not thus contend with a solitary Queen against a large array of his adversary's forces.

7. K. Kt. P. one square.	7. P. takes P.
8. K. R. takes P.	

It is much better for you to take the P. with the R.

* A notice of Ruy Lopez will be found in *Saturday Magazine*, Vol. XVIII., p. 149.

† See *Saturday Magazine*, Vol. XXI., p. 23.

instead of R. P., because the R. has now a wide range of attack. You now also threaten to attack his Q. with your Q. B.

	8. K. Kt. to K. B. third square.
9. Q. Kt. to Q. B. third square.	9. K. Kt. to K. R. fourth square.

Greco now commences one of those brilliant and decisive attacks which are so characteristic of this player. Taking advantage of his adversary's confined position he sacrifices a piece, in order to lay bare the feeble defence of the Black King.

10. K. B. takes K. B. P. checking.

If the K. go to Q. square you win his Q. by playing your Q. B. to K. Kt. fifth square. If he move to K. B. square you win K. Kt.; therefore,

	10. K. takes K. B.
11. Q. B. to K. Kt. fifth square.	11. Kt. takes R.

You save your Q. and win his, by checking.

12. Q. to K. B. third square chg.	12. K. to K. Kt. third square.

His object in moving his K. to this position seems to be to protect his Kt. after you have captured the Q.; but whatever he does he cannot save his game.

13. Q. B. takes Q.	13. K. Kt. to K. R. fourth square.
14. Q. to K. B. fifth square, chg.	14. K. to K. R. third square.
15. Q. Checkmates.	

Mr. Cochrane gives the following defence against this method of opening the game.

1. K. P. two squares.	1. K. P. two squares.
2. K. B. to Q. B. fourth square.	2. K. B. to Q. B. fourth square.
3. Q. to K. second square.	3. Q. to K. second square.
4. K. B. P. two squares.	4. K. Kt. to K. B. third square.

If you advance K. B. P. one square, Black, by advancing Q. P. two squares, will remain with a good game; therefore,

5. K. Kt. to B. third square.	5. Q. P. one square.

If you move K. R. P. one square, with the view of advancing K. Kt. P. two squares, Black, by playing K. Kt. to K. R. fourth square, will gain a pawn or the exchange; you therefore play,

6. Q. Kt. to B. third square.	6. Q. B. P. one square.

in order to prevent the advance of your Q. Kt.

7. Q. P. one square.	7. Q. B. to K. Kt. fifth square.
8. K. B. P. one square.	

You can now advance this pawn with safety.

	8. Q. Kt. to Q. second square.
9. Q. B. to K. Kt. fifth square.	9. K. R. P. one square.

You do not take off his K. Kt., because the Q. Kt. is ready to occupy its place; and if he advance his K. Kt. P. upon the B., you can take it *en passant*.

10. Q. B. to K. R. fourth square.	10. K. Kt. P. two squares.
11. P. takes P. *en passant*.	11. K. B. P. takes P.
12. K. R. P. one square.	12. K. B. takes Kt.
13. Q. takes B.	13. Castles with Q. R

Mr. Cochrane says, "the situation of the Black is full as good as that of the White."

In the following game an approved mode of defence is given, which, after the first nine or ten moves, leaves to each party the choice of castling with an even game.

1. K. P. two squares.	1. K. P. two squares.
2. K. B. to Q. B. fourth square.	2. K. B. to Q. B. fourth square.
3. Q. to K. second square.	3. Q. P. one square.
4. K. B. P. two squares.	4. K. Kt. to K. B. third square.

Black now plays his best move.

5. Q. P. one square.	5. Q. B. to K. Kt. fifth square.
6. K. Kt. to K. B. third square.	6. Q. to K. second square.
7. P. takes K. P.	7. Q. P. takes P.
8. Q. B. to K. third square.	8. Q. Kt. to Q. second.

He thus not only gets out a piece and defends his K. B., but also liberates Q. R., and gives liberty to his K. to castle on either side.

9. Q. Kt. to Q. second.

Having played out your Q. B. you also get out your Q. Kt., which now does not obstruct Q. B., while it will serve to replace K. Kt. should Black capture it, with his B.

	9. K. castles with K. R.
10. K. castles with K. R.	

Mr. Lewis says that the game is now about equal. In his new *Treatise on the Game of Chess*, the publication of which is just completed, Mr. Lewis gives a variation of the above defence, which also leads to an even game. It is very similar to that given by Mr. Cochrane.

1. K. P. two squares.	1. K. P. two squares.
2. K. B. to Q. B. fourth square.	2. K. B. to K. B. fourth square.
3. Q. to K. second square.	3. Q. P. one square.
4. K. B. P. two squares.	4. K. Kt. to K. B. third square
5. K. Kt. to K. B. third square.	5. Q. to K. second square.
6. Q. P. one square.	6. Q. B. to K. Kt. fifth square.
7. K. B. P. takes P.	7. Q. P. takes P.
8. Q. B. to K. Kt. fifth square.	8. Q. Kt. to Q. second square.
9. Q. Kt. to Q. second square.	9. K. castles with Q. R.
10. K. castles with Q. R.	

The first of the two following problems is by M. D'Orville. The author of the second is M. Andersson, of Breslau. Both these problems are very beautiful examples of Chess ingenuity.

PROBLEM XXIII. *White moving first is to give check-mate in four moves.*

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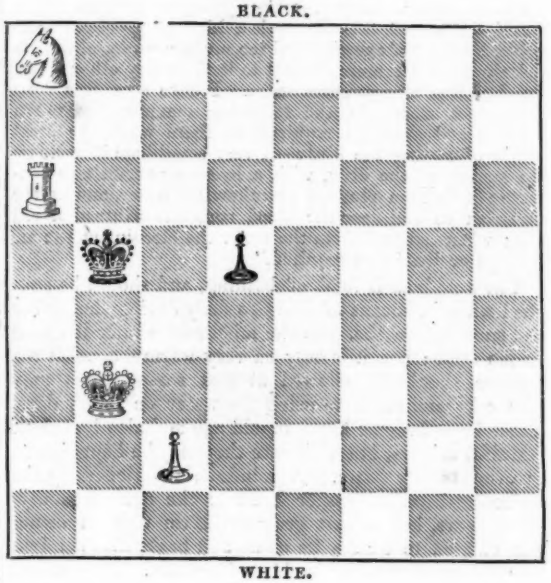

WHITE.

PROBLEM XXIV. *White to move first, and to give check-mate in four moves.*

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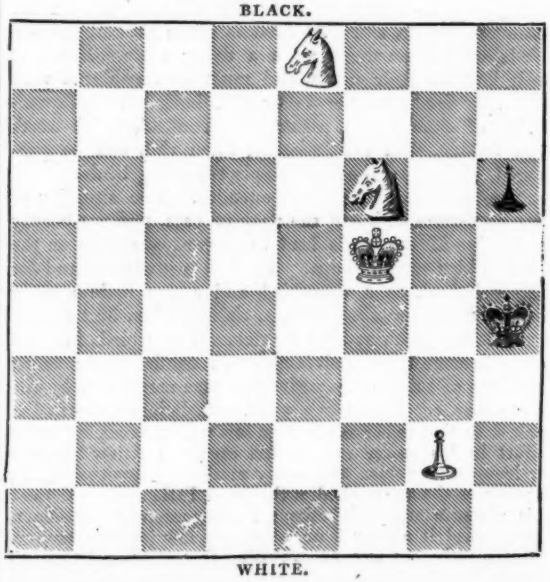

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